WHAT IS CLAIMED IS:

1. An apparatus for generating ozone (O_3) comprising:

a chamber;

a plasma source coupled to said chamber for producing an oxygen plasma from a supply of oxygen, the plasma including at least a mixture of O and O_2 species; and

a quencher disposed within said chamber proximate an output of said plasma source for facilitating ozone generation from the mixture of O and O_2 species.

2. The apparatus of claim 1, wherein said plasma source includes one of the following selected from the group consisting of an r.f. plasma source and a microwave source.

3. The apparatus of claim 1, wherein said quencher includes a quenching surface located down-stream of said plasma source within a prescribed region of the oxygen plasma, wherein the oxygen plasma flows across the quenching surface to generate ozone.

4. The apparatus of claim 3, further wherein the quenching surface includes a plurality of quenching surfaces.

5. The apparatus of claim 4, still further wherein the plurality of quenching surfaces include a plurality of flow channels having inputs and outputs, the inputs disposed proximate the output of said plasma source.

6. The apparatus of claim 1, further comprising:

means for controlling a temperature of said quencher in a prescribed manner for producing a desired form of liquid-phase or gas-phase ozone.

7. The apparatus of claim 6, wherein said temperature control means includes a thermal channel in communication with said quencher suitable for passage of a prescribed coolant through the thermal channel.

8. The apparatus of claim 7, wherein said temperature control means further includes means for controlling a flow rate of coolant through the thermal channel.

9. The apparatus of claim 7, wherein the coolant includes one of the following selected from the group consisting of liquid nitrogen, liquid helium, and liquid oxygen.

10. An apparatus for generating ozone (O_3) comprising:

a chamber;

a plasma source coupled to said chamber for producing an oxygen plasma from a supply of oxygen, the plasma including at least a mixture of O and O_2 species;

a quencher disposed within said chamber proximate an output of said plasma source for facilitating ozone generation from the mixture of O and O_2 species, wherein said quencher includes a plurality of quenching surfaces located down-stream of said plasma source within a prescribed region of the oxygen plasma, the plurality of quenching surfaces including flow channels having inputs and outputs, the inputs disposed proximate the output of said plasma source, wherein the oxygen plasma flows across the quenching surfaces to generate ozone; and

means for controlling a temperature of said quencher in a prescribed manner for producing a desired form of liquid-phase or gas-phase ozone, said control means including at least one channel in thermal communication with said quencher suitable for passage of a prescribed coolant through the channel, said control means further including a controllable flow valve for controlling a flow rate of coolant through the channel.

11. A method for generating ozone (O_3) comprising:

providing a chamber;

providing a plasma source coupled to the chamber for producing an oxygen plasma from a supply of oxygen, the plasma including at least a mixture of O and O_2 species; and

disposing a quencher within the chamber proximate an output of the plasma source for facilitating ozone generation from the mixture of O and O_2 species.

12. The method of claim 11, wherein providing the plasma source includes providing one of the following selected from the group consisting of an r.f. plasma source and a microwave source.

13. The method of claim 11, wherein providing the quencher includes providing a quenching surface located down-stream of the plasma source within a prescribed region of the oxygen plasma, wherein the oxygen plasma flows across the quenching surface to generate ozone.

14. The method of claim 13, wherein the quenching surface includes a plurality of quenching surfaces.

15. The method of claim 14, further wherein the plurality of quenching surfaces include a plurality of flow channels having inputs and outputs, the inputs disposed proximate the output of the plasma source.

16. The method of claim 11, further comprising:

controlling a temperature of the quencher in a prescribed manner for producing a desired form of liquid-phase or gas-phase ozone.

17. The method of claim 16, wherein controlling the temperature of the quencher includes providing a thermal channel in communication with the quencher suitable for passage of a prescribed coolant through the thermal channel.

18. The method of claim 17, wherein controlling the temperature further includes controlling a flow rate of coolant through the thermal channel.

19. The method of claim 17, wherein the coolant includes one of the following selected from the group consisting of liquid nitrogen, liquid helium, and liquid oxygen.

20. A method for generating ozone (O_3) comprising:

providing a chamber;

providing a plasma source coupled to the chamber for producing an oxygen plasma from a supply of oxygen, the plasma including at least a mixture of O and O_2 species;

disposing a quencher within the chamber proximate an output of the plasma source for facilitating ozone generation from the mixture of O and O_2 species, wherein the quencher includes a plurality of quenching surfaces located down-stream of the plasma source within a prescribed region of the oxygen plasma, the plurality of quenching surfaces including flow channels having inputs and outputs, the inputs disposed proximate the output of the plasma source, wherein the oxygen plasma flows across the quenching surfaces to generate ozone; and

controlling a temperature of the quencher in a prescribed manner for producing a desired form of liquid-phase or gas-phase ozone, wherein controlling the temperature includes providing at least one channel in thermal communication with the quencher suitable for passage of a prescribed coolant through the channel and

providing a controllable flow valve for controlling a flow rate of coolant through the channel.

21. A method of generating ozone (O_3) comprising:

supplying oxygen to a plasma source;

igniting and producing an oxygen plasma with the plasma source, the oxygen plasma including a mixture of O and O_2; and

directing the oxygen plasma for movement over a quenching surface of a quencher, the quenching surface located down-stream of the plasma source within a prescribed region of the oxygen plasma, wherein the oxygen plasma flows across the quenching surface to facilitate ozone generation from the mixture of O and O_2.

22. The method of claim 21, further comprising:

controlling a temperature of the quenching surface in a prescribed manner for producing a desired form of liquid-phase or gas-phase ozone.

23. The method of claim 21, wherein the quenching surface includes a plurality of flow channels disposed within the quencher, the flow channels having inputs and outputs, the inputs arranged proximate an output of the plasma source.

24. The method of claim 23, further comprising:

regulating a temperature of the quenching surface.

25. The method of claim 24, wherein regulating the temperature includes controlling the flow rate of a coolant flowing through a cooling channel disposed in the quencher.

26. The method of claim 25, wherein the coolant includes one of the following selected from the group consisting of liquid nitrogen, liquid helium, and liquid oxygen.

27. An apparatus for generating a polyatomic form of a prescribed element comprising:

a chamber;

a plasma source coupled to said chamber for producing plasma of the prescribed element from a supply of the element in a gaseous state, the plasma including at least a mixture of single atomic and double atomic species of the prescribed element; and

a quencher disposed within said chamber proximate an output of said plasma source for facilitating generation of the polyatomic form of the prescribed element from the mixture of single atomic and double atomic species of the prescribed element.

28. The apparatus of claim 27, wherein said plasma source includes one of the following selected from the group consisting of an r.f. plasma source and a microwave source.

29. The apparatus of claim 27, wherein said quencher includes a quenching surface located down-stream of said plasma source within a prescribed region of the plasma, wherein the plasma flows across the quenching surface to generate the polyatomic form of the prescribed element.

30. The apparatus of claim 29, further wherein the quenching surface includes a plurality of quenching surfaces.

31. The apparatus of claim 30, still further wherein the plurality of quenching surfaces include a plurality of flow channels having inputs and outputs, the inputs disposed proximate the output of said plasma source.

32. The apparatus of claim 27, further comprising:

means for controlling a temperature of said quencher in a prescribed manner for producing a desired liquid-phase or gas-phase polyatomic form of the prescribed element.

33. The apparatus of claim 32, wherein said temperature control means includes a thermal channel in communication with said quencher suitable for passage of a prescribed coolant through the thermal channel.

34. The apparatus of claim 33, wherein said temperature control means further includes means for controlling a flow rate of coolant through the thermal channel.

35. The apparatus of claim 33, wherein the coolant includes one of the following selected from the group consisting of liquid nitrogen, liquid helium, and liquid oxygen.

36. The apparatus of claim 27, wherein the prescribed element includes oxygen and the polyatomic form of the prescribed element includes ozone (O_3).

37. A system for processing media with ozone (O_3) comprising:

at least one processing vessel;

means for disposing media to be processed into said at least one processing vessel;

means for supplying ozone to said at least one processing vessel to facilitate a processing of the media by the ozone, said ozone supplying means including a chamber, a plasma source coupled to the chamber for producing an oxygen plasma from a supply of oxygen, the plasma including at least a mixture of O and O_2 species, and a quencher disposed within the chamber proximate an output of the plasma source for facilitating ozone generation from the mixture of O and O_2 species; and

means for removing the processed media from said at least one processing vessel.

38. The system of claim 37, further comprising:

means for destroying residual ozone subsequent to a processing of the media.

39. The system of claim 37, wherein said at least one processing vessel includes a processing chamber, the processing chamber having an input and an output, wherein said means for disposing media into the processing chamber is coupled to the input of the processing chamber, and said means for removing the processed media from the processing chamber is coupled to the output of the processing chamber.

40. The system of claim 37, wherein said at least one processing vessel includes a semiconductor substrate processing chamber and the media includes a semiconductor substrate.

41. The system of claim 37, wherein said at least one processing vessel includes a bioremediation processing chamber and the media includes one of the following selected from the group consisting of gaseous media, liquid media, and solid media.

42. A method for processing media with ozone (O_3) comprising:

providing at least one processing vessel;

disposing media to be processed into the at least one processing vessel;

supplying ozone to the at least one processing vessel to facilitate a processing of the media by the ozone, wherein supplying ozone is provided by an ozone generator including a chamber, a plasma source coupled to the chamber for producing an oxygen plasma from a supply of oxygen, the plasma including at least a mixture of O and O_2 species, and a quencher disposed within the chamber proximate an output of the plasma source for facilitating ozone generation from the mixture of O and O_2 species; and

removing the processed media from the at least one processing vessel subsequent to processing of the media by the ozone.

43. The method of claim 42, further comprising:

destroying residual ozone subsequent to ozone processing of the media.

44. The method of claim 42, wherein the at least one processing vessel includes a processing chamber, the processing chamber having an input and an output, wherein said disposing the media into the processing chamber is coupled through the input of the processing chamber and said removing the processed media from the processing chamber is coupled through the output of the processing chamber.

45. The method of claim 42, wherein the at least one processing vessel includes a semiconductor substrate processing chamber and the media includes a semiconductor substrate.

46. The method of claim 42, wherein the at least one processing vessel includes a bioremediation processing chamber and the media includes one of the following selected from the group consisting of a gaseous media and a porous solid media.